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DIVISION OF  
OIL GAS & MINING

July 9, 1992

Mr. Dennis Owens, P.E.  
Tetra Tech, Inc.  
1555 West 2200 South, Suite B  
Salt Lake City, UT 84119

RE: Jumbo Mining Preliminary QA/QC Plan

Dear Mr. Owens:

As per our letter of June 23, 1992 the following comments are provided on the submitted QA/QC manual for the new heap leach facility.

- I. See page 8. Generally we consider 3 successful sealed single ring infiltrometer (SSRI) (1.6 meter diameter) tests equivalent to or in lieu of the sealed double ring infiltrometer tests. In Table 3-1 on page 9, we would like the following adjustments to be made:

<u>Item</u>	<u>Testing</u>	<u>Frequency (Change)</u>
Clay Source	Atterbergs	1500 yd <sup>3</sup>
Construction	Density and Moisture Content	185 yd <sup>3</sup> , corresponding to a 100' X 100' X 6" grid.
	Atterbergs and Sieve Analysis	750 yd <sup>3</sup> , corresponding to a 200' X 200' X 6" grid

- II. We feel it is important that much of the QA criteria be included in the specifications for emphasis rather than just referencing it in another location. We think the following items should definitely be included:

- A. A checklist of the requirements for FML testing.
- B. See item 3.2.5. Maximum size diameter rock in the bedding should be specified.
- C. Item 3.2.7.
- D. Weather constraints discussed in item 3.2.8.
- E. Item 3.2.10 rejection standards should be specified.
- F. Item 4.1. Chain of custody form should be provided.
- G. Item 6.0.2.A. Outlier criteria for rejection must be specified.
- H. Item 11.0. A corrective action checklist should be specified.
- I. Appendix A, page 4, lists water content tests. Water content should in general be on 2-3% higher than optimum to assure correct permeability. This item should not conflict with item 3.1., or moisture content correlated permeability analyses.

Mr. Owens  
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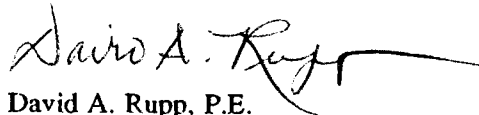
- III. Settlement stand design for the pads were discussed in our earlier meetings. Settlement stands are required to measure deflection in subgrade fill areas. If fill areas will exist, then stands would be required in cut areas for reference. Please submit a proposed layout, as applicable.

Allowable deflection in the pad. Our proposed regulations require a structural foundation designed such that liner and seepage detection systems shall not be subjected to any movements which would produce a longitudinal, vertical or differential strain over any area of the pad in excess of 0.3% strain due to settlement, uplift, or other displacement.

Under the proposed regulations, the complete design for the structural foundation would need to be submitted for approval prior to issuance of the construction permit. The designer would indicate and justify what heap leach pad surface movements would cause the specified strain. The design would also need to include the construction specifications and quality control procedures that would be required to meet the specified strain requirements. It could be of paramount importance that the site and adjustments thereto be analyzed to assure that this criteria can be met, with an ore height that will be economically viable.

We request you address the above comments in writing and those of our previous letters of August 14, 1991 and June 23, 1992. You may wish also to make an initial plan and specification submittal incorporating the above comments, in preparation for a final contract design submittal.

Sincerely,



David A. Rupp, P.E.  
Design Evaluation Section

DAR:rvg

cc: Ed King, Jumbo Mine, Austin, TX  
Roger Foisy, District Engineer  
BLM House Range District, Fillmore  
D. Wayne Hedberg, DOGM ✓  
M. Novak, DWQ

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